

2. Zoological Results of the Third Tanganyika Expedition,  
conducted by Dr. W. A. Cunningham, 1904-1905.  
Report on the Macrurous Crustacea. By W. T.  
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(Plates XI.-XIV.\*)

i. *Introduction.*

The collection of Macrurous Crustacea obtained by Dr. Cunningham from the lakes of Central Africa comprises thirteen species, of which only three have been previously described. In Nyasa and Victoria Nyanza only a single species was found, a common and widely-distributed form, already recorded from the latter lake. In Tanganyika, in addition to the two species discovered by Mr. Moore, Dr. Cunningham has been fortunate enough to find no less than ten new species, and among them representatives of what I regard as two new genera. The following is a list of the species obtained:—

NYASA.

*Caridina nilotica*, var. *gracilipes* (de Man).

TANGANYIKA.

*Palæmon moorei* Calman.

*Limnocaridina retarius*, n. sp.

„ *parvula*, n. sp.

„ *tanganyikæ* Calman.

„ *similis*, n. sp.

„ *latipes*, n. sp.

„ *socius*, n. sp.

„ *spinipes*, n. sp.

*Caridella cunningtoni*, n. g. et sp.

„ *minuta*, n. sp.

*Atyella brevirostris*, n. g. et sp.

„ *longirostris*, n. sp.

VICTORIA NYANZA.

*Caridina nilotica*, var. *gracilipes* (de Man).

I am obliged to Dr. Cunningham for giving me his notes on the occurrence and coloration of the various forms. These I have incorporated in their proper places. It is right that mention should be made of the excellent state of preservation of the specimens, and of the very careful and methodical manner in which the notes of localities and other particulars were kept.

\* For explanation of the Plates, see p. 205.

ii. *Systematic Notes and Descriptions of New Genera and Species.*

Family PALÆMONIDÆ.

PALÆMON MOOREI Calman. (Plate XI. figs. 1 & 1a.)

*P. moorei* Calman, Proc. Zool. Soc. 1899, p. 709, pl. xl. figs. 20-24.

The numerous and excellently-preserved specimens of this species which Dr. Cunningham has brought home enable me to add some further details to the description which I formerly gave. Of 18 specimens collected only two are males. This is a somewhat remarkable fact, since in this genus, as Coutière remarks, it is rare for the females to be as numerous as the males. The largest specimen is an ovigerous female, 27 mm. in total length. The males are a little smaller. The teeth of the rostrum are  $\frac{2.3+7.11}{3.5}$ .

The second pair of peræopods in the females (Plate XI. figs. 1 & 1a) differ from those of the male formerly figured, and from those of the two males in the present collection, in having two low rounded teeth or tubercles on the inner edge of each of the fingers close to the proximal end. The males do not differ from the females in the length or stoutness of the chelæ. The carpus and hand are rough with minute sharp granules or spines, which were not well shown in the figure formerly given. There is some little variation in the relative lengths of the segments of this limb, as the following measurements (in millim.) show:—

	Merns.	Carpus.	Palm.	Fingers.
Female .....	4.0	4.5	3.6	3.9
„ .....	4.3	4.9	4.2	3.7
„ .....	4.7	5.0	3.5	3.9
„ .....	4.5	4.5	4.5	4.3
Male .....	2.9	3.3	2.5	3.0
„ .....	3.6	3.6	2.3	3.1

The mandible carries a palp which, although short (about half the length of the incisor process), is composed of three distinct segments, and in all other respects the species conforms to the definition of the genus\* to which I have referred it.

As it is by no means easy to determine what are the affinities of this species among the very numerous and closely allied species of the genus, I have submitted a specimen to Dr. J. G. de Man, whose competence to pass judgment on this point will not be disputed. With his accustomed courtesy, Dr. de Man sent me a long letter dealing with the subject, and with his permission I quote some of his remarks. After noticing that *P. moorei* is, without doubt, the smallest species of the genus, and that it has, at first sight, quite the general appearance of some species of

\* I follow Ortmann, de Man, and the majority of recent authors in retaining the name *Palæmon* for this genus. I am unable to understand the reasons which have led some American authors to follow Spence Bate in using for it the name *Bithynis*.

the genus *Caridina*, Dr. de Man goes on to say—" *P. sundaicus* Heller, with its varieties, does not seem to me to be the most nearly allied to *P. moorei* as you suggest. Like Coutière (Ann. Sci. Nat. 8<sup>me</sup> sér. xii. p. 324), I think that *P. superbus* Heller and *P. trompi* de Man, especially the former, are the most closely allied species. *P. scabriculus* Heller and *P. alcocki* Nobili are apparently also related. All these forms, however, are in a greater or less degree different from your species. *P. trompi*, from Borneo, is at once distinguished by the few and large eggs, by the shape of the telson, the toothling of the fingers, &c. *P. scabriculus* differs in the carapace, which is scabrous, in the rostral teeth, of which six are set on the carapace, and in other characters. *P. alcocki* has the carpus of the second legs almost twice as long as the merus, and little shorter than the chela. *P. moorei* ought, in my opinion, to be considered as a distinct and interesting species."

To this I may add that *P. superbus* Heller, as re-described and figured by Coutière (*t. c.* p. 319, pl. xiii. figs. 34-37), grows to a very much larger size than *P. moorei*; and when specimens of about the same size are compared, it seems to differ in having the chelæ smooth and beset with rather long hairs. *P. niloticus* Roux, of which a specimen from the Blue Nile has recently been presented to the Museum by Captain Stanley Flower, clearly differs from *P. moorei* in many characters. It is of much larger size (the specimen before me is 41 mm. in total length); the rostrum has a strongly convex upper edge with eleven teeth, of which only one is on the carapace while the distal one is some distance from the tip; the lower edge of the rostrum bears two teeth (Klunzinger and Heller agree in giving the number as 1-2, so that Roux's figure, which shows five, is no doubt incorrect); the merus of the second legs is three-fourths of the length of the carpus, which is a very little longer than the chela; the fingers are about equal to the palm, and the whole limb is smoother than in *P. moorei*.

*Occurrence*.—Off Niamkolo, 12.viii.04. "Dredged in about 12 fathoms, among shells." About sixteen females and one male.

Kalambo, 4.xi.04. "Tow-netting, surface, 8.20 p.m." One very young specimen.

Kirando, 1.xii.04. "Taken in about 10 fathoms." One female.

Mrumbi, 27.xii.04. "From about 30 fathoms." One male.

#### Family ATYIDÆ.

CARIDINA NILOTICA, var. GRACILIPES (de Man).

*C. wyckii*, var. *gracilipes* de Man, in Weber's 'Zool. Ergeb. Niederländisch Ost-Indien,' ii. p. 393 (1891).

All the prawns obtained by Dr. Cunningham from Lake Nyasa and the Victoria Nyanza belong to the genus *Caridina*, and to that section of the genus including the forms to which the specific names *nilotica*, *longirostris*, and *wyckii*, as well as a series of varietal names, have been applied. It is not easy to determine

what position the present forms ought to occupy within this group; and even if that question were satisfactorily answered, there would still remain room for discussion as to the appropriate name to be applied to them. It is generally agreed that Milne-Edwards's *longirostris*, described as coming from Algiers, but not since found there, is identical with the earlier *nilotica* described by Roux from the Nile. From de Man's re-examination of Milne-Edwards's types, we know that it has the carpus of the first chelipeds one and a half times as long as broad. From this Dr. de Man separates as a distinct species, under the name *C. wyckii* Hickson, those forms which have the first carpus at least twice as long at broad. Prof. Bouvier (Bull. Sci. France et Belgique, xxxix. p. 79, 1905) has pointed out, however, and I can confirm the statements, that co-types of Prof. Hickson's species, from Celebes, have the carpus exactly as in the types of *longirostris*. Specimens received from Prof. Hickson, and preserved in the British Museum, agree very closely indeed with de Man's description of his *C. nilotica*, var. *minahasae* (also from Celebes), differing chiefly in the shorter dactylus of the posterior peraeopods, that of the fourth pair being less than one-fifth, and that of the fifth pair one-fourth of the corresponding propodus. It follows that, so far as the characters of the carpal segments are concerned, *C. wyckii* Hickson must be regarded as a synonym of *C. nilotica* Roux, while *C. wyckii* de Man, if it is to be regarded as distinct, must receive a new specific or varietal name. Prof. Bouvier appears to regard de Man's species as merely a variety of that of Roux and Milne-Edwards (*t. c.*, table on p. 73; on p. 79, however, he treats it as a separate species); and in this I am disposed to concur, although the material at my disposal is too scanty to enable me to form a definite opinion. At all events the specimens collected by Dr. Cunningham in Lake Nyasa and in Victoria Nyanza, while not agreeing exactly with each other or with any of the described forms, come sufficiently near to the variety *gracilipes*, which de Man places under the species *wyckii*, and Bouvier under *nilotica*; and I therefore record them under the latter name. The following particulars were found to agree in several specimens from each locality, ovigerous females being compared in each case:—

*Nyasa*.—Total length up to 21 mm. Rostrum reaching beyond antennal scale, teeth  $\frac{1-2+21-27}{10-18}$ , unarmed terminal part of upper edge much less than half its length; one or two sub-apical teeth, and, occasionally, an isolated tooth a little way back from the tip. Carpus of first peraeopods two and a half times as long as broad, that of second pair more than five times as long as broad. Dactylus of fourth pair one-fifth of propodus or a little over, bearing 7-9 spines; that of fifth pair a little more than one-fourth of propodus, with about 33-38 spines. Eggs  $47 \times 27$  mm.

*Victoria Nyanza*.—Total length up to 25 mm. Rostrum, except in one or two cases, reaching beyond antennal scale, teeth  $\frac{2+16-21}{15-21}$ ,



unarmed part of upper edge much less than half its length, one or two sub-apical teeth, and occasionally an isolated tooth as above described. Carpus of first pereopods not more than two and a third times as long as broad (in a series of specimens collected at Entebbe, by Mr. E. Degen, the carpus is only about twice as long as broad, sometimes a little less than twice). Carpus of second pair less than five times as long as broad. Dactylus of fourth pair a little more than one-fifth of propodus, with 8-11 spines; that of fifth pair more than one-fourth of propodus, with 37-50 spines. Eggs  $.6 \times .37$  to  $.62 \times .4$  mm.

Hilgendorf has recorded *C. wyckii* var. *gracilipes* from several localities in the Victoria Nyanza (Deutsch-Ost-Afrika, iv. (7) p. 36, 1898) and elsewhere in German East Africa. Prof. Bouvier, who does not quote Hilgendorf's work, records from Victoria Nyanza and from Douflé (Dufi) on the Upper Nile (about  $3^{\circ} 31'$  N. lat.) specimens which he regards as intermediate between the typical *C. wyckii* of de Man and the South African var. *paucipara* Max Weber. The eggs in the specimens collected by Dr. Cunningham are rather smaller than those which Prof. Bouvier records from Lake Victoria, and much smaller than in the typical *paucipara*, while in other respects, such as the number of spines on the dactyli of the ambulatory legs, they show no approach to *paucipara*.

#### Genus LIMNOCARIDINA.

*Limnocaridina* Calman, Proc. Zool. Soc. 1899, p. 704.

To this genus, hitherto represented by only a single species discovered by Mr. Moore, I refer six of the new species found by Dr. Cunningham. As originally defined, the genus was distinguished chiefly by the great reduction of the branchial system, by the presence of a "hepatic" instead of an "antennal" spine on the carapace, and by the characters of the first and second maxillæ and the first maxilliped. In all the species described below, the branchial formula agrees with that formerly given for *L. tanganyikæ*, and there is no epipod on the first maxilliped. The structure of the maxillæ is also essentially the same, though, in the second maxillæ, the middle lobe is sometimes more expanded than it is in *L. tanganyikæ*, but not overlapping the distal lobe. With regard to the spine on the carapace, however, the new species to be described below show that the difference between *L. tanganyikæ* and the species of *Caridina* is one of position, not of homology. The spine, which in *L. socius* and *L. spinipes* is in the same position as the "antennal" spine of *Caridina*, is clearly homologous with that which, in *L. latipes*, *L. similis*, *L. parvula*, and *L. reticularius*, corresponds with what I formerly described as the "hepatic" spine of *L. tanganyikæ*. In the following descriptions therefore I have abandoned the terms "antennal" and "hepatic," and speak simply of the "antero-lateral spine" of the carapace. In the original description of *L. tanganyikæ* it is stated that the carpus of the first pereopods

is "slightly excavated distally on the inner side." While this is quite correct and holds good also for the new species described below, it should be pointed out that this very slight excavation, not visible from the outer side, is very different from the marked excavation of the anterior margin of the carpus found in most of the species, at least, of the allied genera. Since, however, the excavation is about equally slight in some of the species of *Caridina*, it does not seem advisable to include this character in the generic definition. In all cases the terminal brushes of setæ on the fingers of the chelæ are more scanty than in any species of *Caridina* which I have seen.

*Key to the Species of Limnocaridina.*

- |                                                                                                           |                              |
|-----------------------------------------------------------------------------------------------------------|------------------------------|
| A. Fingers of chelæ five to seven times as long as the palm, with very long marginal setæ.                |                              |
| a. Rostrum about equal to antennular peduncle.....                                                        | <i>L. retarius</i> , n. sp.  |
| b. Rostrum less than half as long as first segment of antennular peduncle .....                           | <i>L. parvula</i> , n. sp.   |
| B. Fingers of chelæ not more than twice as long as the palm; setæ not very long, confined to distal part. |                              |
| a. Length of sixth abdominal somite more than twice its depth.                                            |                              |
| a. Rostrum much longer than the carapace, with 10-20 teeth below .....                                    | <i>L. tanganyikæ</i> Calman. |
| b. Rostrum about equal to carapace, with 3-6 teeth below .....                                            | <i>L. similis</i> , n. sp.   |
| c. Rostrum less than one-third of length of carapace, unarmed below .....                                 | <i>L. latipes</i> , n. sp.   |
| b. Length of sixth abdominal somite little more than one and a half times its depth.                      |                              |
| a. Rostrum nearly equal to carapace; merus of last three legs with one spine .....                        | <i>L. socius</i> , n. sp.    |
| b. Rostrum little more than half length of carapace; merus of last three legs with 2-3 spines .....       | <i>L. spinipes</i> , n. sp.  |

*LIMNOCARIDINA RETIARIUS*, n. sp. (Plate XI. figs. 2-8.)

*Description*.—Body slender; sixth somite of abdomen a little shorter than the carapace, length more than two and a half times its depth. Rostrum (Plate XI. fig. 2) about equal to or a little shorter than antennular peduncle, two-thirds as long as carapace, decurved at base, then horizontal or slightly recurved towards tip, teeth  $\frac{2+4+7-10}{0-3}$ , unarmed above for nearly half its length from tip. Antero-lateral spine of carapace set well back from front edge. Antennular peduncle reaching to external tooth of antennal scale. Distal edge of scale (Plate XI. fig. 3) projecting beyond external tooth. Third maxilliped extending to end of second segment of antennular peduncle, exopod not longer than ischium, terminal segment slender but a little shorter than preceding segment. First pereopods (Plate XI. fig. 4) reaching to tip of third maxillipeds, breadth of carpus two-thirds of its length, chela about three times as long as carpus, palmar portion less than one-fifth of length of fingers. Second pereopods (Plate XI. fig. 5) reaching a little beyond first, breadth of carpus little more than two-fifths of its length; chela a little more

than twice as long as the carpus, palmar portion about one-fifth of length of fingers. Fingers of both chelæ slightly spoon-shaped, bearing along the whole length of their opposed edges on the outer and inner sides a single row of very long flexible setæ regularly arranged; each seta has a double series of rather widely-spaced barbs. Last three pairs of peræopods not differing greatly in length, third pair not reaching tip of third maxillipeds; dactylus of third and fourth pairs (Plate XI. fig. 6) more than half the length of propodus, with 14 spines; that of the fifth pair (Plate XI. fig. 7) nearly two-thirds of length of propodus, with 26 spines. Telson (Plate XI. fig. 8) three-fifths of length of sixth abdominal somite. Outer plate of uropods longer than inner.

Total length, ♀, 13.8 mm. Eggs  $.3 \times .18$  mm.

*Remarks.*—This species is distinguished from all the *Atyidæ* hitherto described by the remarkable and beautiful armature of its chelæ. The setæ with which the fingers are furnished, instead of forming apical tufts as in other *Atyidæ*, diverge from the outer and inner edges of each finger. As far as can be seen in the preserved specimens, these setæ entirely prevent the fingers from being brought together, so that the chelæ cannot be used for seizing objects in the ordinary way. On the other hand, each chela forms a kind of double casting-net, no doubt very efficient in the capture of minute living prey. The great length of the dactylus of the posterior legs is also a characteristic feature. In the structure of the mouth-parts and in the branchial formula the species shows no important differences from the other members of the genus.

*Occurrence.*—Mbete, 1.x.04. "Taken in shrimp-net, shore-wading." Among 17 specimens there are only three females, one of which carries eggs.

*LIMNOCARIDINA PARVULA*, n. sp. (Plate XI. figs. 9–14.)

*Description.*—Body very slender; sixth somite of abdomen as long as the carapace, three times as long as deep. Rostrum (Plate XI. fig. 9) very short, less than half as long as first segment of antennular peduncle, expanded horizontally at the base; teeth  $\frac{6-7+0-2}{0}$ . Antero-lateral spine of carapace set more than twice its own length from front edge. Antennular peduncle reaching well beyond external tooth of antennal scale. Distal edge of scale projecting beyond external tooth. Third maxilliped extending to end of first segment of antennular peduncle, exopod longer than ischium, terminal segment shorter than preceding segment. First peræopods (Plate XI. fig. 10) reaching to end of penultimate segment of third maxillipeds, breadth of carpus less than two-thirds of its length; chela about three times as long as carpus, palmar portion about one-seventh of length of fingers. Second peræopods (Plate XI. fig. 11) reaching a little beyond first, breadth of carpus little more than half its length, chela two and a half times as long as carpus, palmar portion about

one-sixth of length of fingers. Shape of fingers and setæ much as in *L. retarius*, but the setæ are shorter and are almost smooth, their barbs being extremely short and inconspicuous. Third pair of pereopods reaching beyond tip of third maxillipeds, last pair distinctly shorter. Dactylus of third and fourth pairs (Plate XI. fig. 12) less than half the length of the propodus, without spines, except the terminal one which is long and slender; that of fifth pair (Plate XI. fig. 13) less than two-thirds of length of propodus, with a terminal and a short subterminal spine. Telson (Plate XI. fig. 14) a little more than half as long as sixth abdominal somite. Outer plate of uropods a little longer than inner.

Total length (ovigerous ♀) 6.25–6.7 mm. Eggs  $.26 \times .16$  mm.

*Remarks.*—This species, the smallest of the genus, is closely allied to the preceding by the structure of the chelæ. It is strikingly distinguished, however, not only by the very short rostrum (which, in some specimens, may be even shorter than in that figured), but also by the very different armature of the dactylus in the posterior pairs of legs.

*Occurrence.*—Kasawa, tow-netting, 8.30 p.m., 7.x.04. Many specimens. Only three ovigerous females.

Kalambo, tow-netting, 8.20 p.m., 4.xi.04. Six specimens, including two ovigerous females.

Karema, 12.xii.04. "tow-netting, surface, 8 30 p.m." Many specimens.

#### LIMNOCARIDINA TANGANYIKÆ Calman.

*Limnocaridina tanganyikæ* Calman, Proc. Zool. Soc. 1899, p. 704, pls. xxxix. & xl. figs. 1–2, 4–19.

I have very little to add to the account which I have already given of this species. Some of the specimens in the present collection are larger than any previously seen, reaching about 26 mm. in total length. The distal edge of the antennal scale reaches beyond the external spine. There is a single spine on the merus and another on the carpus of each of the last three pairs of legs. The sixth abdominal somite is about equal to the carapace, and its length two and a half times its depth.

*Occurrence.*—Kasakalawe, 4.viii.04. "Taken in rock-pool about tide-mark." Two ovigerous females.

Mtondwe Bay, 10.viii.04. "Swampy shallows." Seven specimens, four ovigerous.

Mtondwe Bay, Niamkolo, 13.viii.04. "Taken in shrimp-net in a few feet of water."

Kituta, 24.viii.04. "Enormous swarms were seen swimming close to the surface in about 10 feet of water on a calm afternoon. Colour uniform bluish-grey." Dr. Cunningham notes that these specimens differed much in colour and in general aspect from the other specimens of *L. tanganyikæ*, and he suspected that they might be a distinct species, but I cannot find any noteworthy structural differences.



Kituta Bay, 27.viii.04. "Tow-netting, surface, 8.30 p.m." Two specimens.

Mbete, 1.x.04. "Taken shore-wading." One female.

Kasawa, 7.x.04. "Tow-netting, 8.30 p.m." Many specimens.

Kalambo, 4.xi.04. "Tow-netting, 8.20 p.m." Three specimens.

Kazagga, 7.iii.05. "Taken close to shore." One specimen.

*LIMNOCARIDINA SIMILIS*, sp. n. (Plate XII. figs. 15-22.)

*Description*.—Body slender; sixth somite of abdomen shorter than the carapace, its length about two and a half times its depth. Rostrum (Plate XII. fig. 15) a little longer than antennular peduncle, equal to or shorter than carapace, slightly arched at base, then horizontal, teeth  $\frac{3-4+7-9}{3-6}$ , unarmed above for half its length. Antero-lateral spine of carapace set well back from front edge. Antennular peduncle reaching to external tooth of antennal scale. Distal edge of scale (Plate XII. fig. 16) projecting well beyond external tooth. Third maxilliped not reaching to end of second segment of antennular peduncle, terminal segment little shorter than preceding. First pereopods (Plate XII. fig. 17) short and stout, reaching to about the first third of first segment of antennular peduncle, breadth of carpus about three-fifths of its length, chela more than one and a half times as long as the carpus, twice as long as broad, fingers equal to the palmar portion. Second pereopods (Plate XII. fig. 18) reaching a little beyond first pair, breadth of carpus about one-third of its length; chela little longer than carpus, three times as long as broad, palmar portion two-thirds of length of fingers. Third pereopods extending beyond and fifth pair falling considerably short of tip of third maxillipeds; dactylus of last three pairs more than one-third of propodus, that of third and fourth (Plate XII. fig. 19) with 14-15, that of the fifth (Plate XII. fig. 20) with 21 spines. Telson (Plate XII. fig. 22) four-fifths of length of sixth abdominal somite. Outer plate of uropods longer than inner.

Total length, ♀, 16.5 mm. Eggs .28 × .18 mm.

*Remarks*.—This species is closely allied to *L. tanganyikæ*, but is distinguished by the much shorter rostrum. One very remarkable feature is the strongly marked difference between the sexes in the armature of the third and fourth pereopods. In the male (Plate XII. fig. 21) the marginal spines on these segments greatly exceed in size those of the female. A similar difference, though less strongly marked, is found in the species described below as *L. socius*, but in the other species of the genus I have not been able to perceive any difference between the sexes in this respect.

*Occurrence*.—Kalambo, 4.xi.04. "Tow-netting, 8.20 p.m." One specimen.

Rusisi River, close to Tanganyika, 7.iii.05. Many specimens, mostly females.

LIMNOCARIDINA LATIPES, sp. n. (Plate XII. figs. 23-29.)

*Description*.—Body slender; sixth somite of abdomen a little longer than carapace, length two and a half times its depth. Rostrum (Plate XII. fig. 23) less than one-third of length of carapace, much shorter than first segment of antennular peduncle, horizontal, teeth  $\frac{1-2+2-4}{9}$ . Antero-lateral spine of carapace set a little way back from front edge. Antennular peduncle reaching to external tooth of antennal scale. Distal edge of scale (Plate XII. fig. 24) projecting beyond external tooth. Third maxilliped hardly extending beyond first segment of antennular peduncle, terminal segment two-thirds the length of preceding segment. First pereopods (Plate XII. fig. 25) hardly reaching middle of penultimate segment of third maxilliped, breadth of carpus about one-half of its length; chela one and a half times as long as carpus, two and a half times as long as broad, palmar portion a little shorter than the fingers. Second pereopods (Plate XII. fig. 26) reaching a little beyond first, breadth of carpus less than one-third of its length, chela a little longer than the carpus, four times as long as broad, palmar portion a little shorter than fingers. Last three pairs of pereopods stout, third pair extending well beyond tip of third maxillipeds, fifth pair hardly reaching beyond base of penultimate segment of same. Merus and carpus of last three pairs each with a single spine; dactylus very short and broad, that of fourth pair (Plate XII. fig. 27) about one and a half times as long as broad, and one-fourth of length of propodus, armed with nine large spines; that of fifth pair (Plate XII. fig. 28) hardly twice as long as broad, a little more than one-fourth of length of propodus, with ten spines. Telson (Plate XII. fig. 29) little more than half the length of sixth abdominal somite. Outer plate of uropods a little longer than inner.

Total length 9.7 mm. Eggs  $.25 \times .16$  mm.

*Remarks*.—This small species is easily distinguished from the other members of the genus by its very short rostrum, and by the short and broad dactyli of the posterior pereopods. The spines of the dactyli are unusually large, and do not differ in size in the two sexes. According to Dr. Cunningham's notes, the colour of this species in life was "greenish, with red and yellow spots."

*Occurrence*.—Mbete, 29.ix.04. "Shallow water amongst rocks." Two specimens.

Near mouth of Lofu, 6.x.04. "Taken on rocks, shallow water." Four females and eight males.

Kalambo, 4.xi.04. "Tow-netting, 8.20 p.m." One specimen.

Tembwi, 2.i.05. "Taken on rocks, shallow water." Five specimens

LIMNOCARIDINA SOCIUS, sp. n. (Plate XII. figs. 30-37.)

*Description*.—Body stout; sixth somite of abdomen less than

two-thirds of length of carapace, length about one and a half times its depth. Rostrum (Plate XII. fig. 30) a little longer than antennular peduncle, equal to or a little shorter than carapace, nearly horizontal, teeth  $\frac{3.4+1-12}{4-9}$ , those of dorsal edge rather long and slender, unarmed above for less than one-third of its length. Antero-lateral spine of carapace set close to front edge. Antennular peduncle distinctly shorter than antennal scale. Distal edge of scale (Plate XII. fig. 31) not projecting as far as the long external tooth. Third maxillipeds extending to end of second segment of antennular peduncle, terminal segment shorter than preceding. First pereopods (Plate XII. fig. 32) short and rather stout, not extending beyond middle of first segment of antennular peduncle, breadth of carpus about three-fifths of its length; chela about one and a half times as long as the carpus, about two and a half times as long as broad, palmar portion one and a half times as long as the fingers. Second pereopods (Plate XII. fig. 33) hardly reaching to end of first segment of antennular peduncle, breadth of carpus less than one-quarter of its length; chela little longer than carpus, more than four times as long as broad, palmar portion about equal to fingers. Third pereopods reaching beyond, fifth pair falling considerably short of tip of third maxillipeds. Merus and carpus of last three pairs each with a single spine; dactylus a little less than one-quarter of length of propodus, that of fourth (Plate XII. fig. 34) with seven, that of fifth (Plate XII. fig. 36) with thirteen spines. Telson (Plate XII. fig. 37) a little shorter than sixth abdominal somite. Outer plate of uropods shorter than inner.

Total length 12 mm. Eggs  $.26 \times .17$  mm.

*Remarks.*—This species was twice found in company with *L. spinipes*, which it resembles in the rather short stout body, in the position of the antero-lateral spine close to the front edge of the carapace, and in having the outer plate of the uropods shorter than the inner. It differs in the shorter rostrum, in the short fingers of the first chelæ, and in the presence of only one spine on the merus of the posterior legs. In the male, the spines on the dactyli of the third and fourth pereopods are somewhat stronger than in the female (Plate XII. fig. 35).

*Occurrence.*—Niamkolo Harbour, 7.ix.04. "Dredged in about 3 fathoms among shells." Many specimens.

Utinta, 5.xii.04. "Dredged in about 10 fathoms among shells." One specimen.

Kirando, 1.xii.04. "Taken in about 8 fathoms of water, among shells." One specimen.

LIMNOCARIDINA SPINIPES, sp. n. (Plate XIII. figs. 38–44.)

*Description.*—Body stout; sixth somite of abdomen less than two-thirds of length of carapace, length about one and a half times its depth. Rostrum (Plate XIII. fig. 38) reaching to end of second segment of antennular peduncle, one-half to nearly two

thirds of length of carapace, horizontal, teeth  $\frac{2.4+6.9}{2.4}$ , unarmed above for one-fourth of its length. Antero-lateral spine of carapace small, set close to front edge. Antennular peduncle a little shorter than antennal scale. Distal edge of scale (Plate XIII. fig. 39) not projecting so far as the external tooth. Third maxillipeds not reaching to end of second segment of antennular peduncle, terminal segment a little shorter than preceding. First pereopods (Plate XIII. fig. 40) short and stout, not reaching middle of first segment of antennular peduncle, breadth of carpus about two-fifths of its length; chela one and a half times as long as carpus, two and a half times as long as broad, palmar portion slightly shorter than fingers. Second pereopods (Plate XIII. fig. 41) not reaching end of first segment of antennular peduncle, breadth of carpus one-fifth of its length; chela equal to carpus, about four times as long as broad, palmar portion little more than half of length of fingers. Third pereopods reaching well beyond, fifth pair falling short of tip of third maxillipeds. Merus of last three pairs with two, sometimes three, spines on distal part of the lower margin, carpus with two spines side by side. Dactylus in each case a little less than one-third of length of propodus, that of third pair (Plate XIII. fig. 42) with five, that of fifth (Plate XIII. fig. 43) with twelve spines. Telson (Plate XIII. fig. 44) a little shorter than sixth abdominal somite. Outer plate of uropods a little shorter than inner.

Total length 7 mm. Eggs .25 x .15 mm.

*Remarks.*—This species resembles the preceding very closely, but the distinguishing characters are constant in all the specimens examined.

*Occurrence.*—Niamkolo Harbour, 7.ix.04. "Dredged in about 3 fathoms, among shells." Two specimens.

Kirando, 1.xii.04. "Taken in about 8 fathoms of water, among shells." Many specimens.

Utinta, 6.xii.04. "Dredged in about 15 fathoms among shells." Twelve specimens.

#### Genus CARIDELLA, gen. nov.

Pereopods without exopods; carpus of first pair excavated distally, that of second pair not excavated; chelæ of both pairs with a distinct palmar portion. Epipods on the first three pairs of pereopods. No pleurobranchia on the last thoracic somite.

Type, *C. cunningtoni*, sp. n.

This new genus is intermediate to some extent between *Caridina* and *Limnocaridina*. It resembles the former in the general structure of the mouth-parts, in the presence of an outer plate on the first maxilla and of a minute epipod on the first maxilliped. It approaches *Limnocaridina* in the reduction of the branchial system and especially in the absence of the posterior pleurobranchia, while several of the gills in the anterior part of the branchial chamber are also absent or reduced to small vestiges.



It is extremely difficult to determine exactly the number of gills in species so small as those described below; and the following formula for *C. cunningtoni* is given with the reservation that some minute vestiges of gills may have been overlooked. The absence of the posterior pleurobranchia, however, as well as the absence of an epipod from the penultimate legs, are characters which it is comparatively easy to demonstrate and which seem to justify the establishment of the new genus.

Branchial formula of *Cardiella cunningtoni*.

	mxp. 1	mxp. 2	mxp. 3	per. 1	per. 2	per. 3	per. 4	per. 5
Pleurobranchiæ .....	0	0	0	1	1	1	1	0
Arthrobranchiæ .....	0	0	r.	0	0	0	0	0
Podobranchiæ .....	ep.	ep.	ep.	ep.	ep.	ep.	0	0

In the case of *C. cunningtoni*, the large and peculiar first pair of chelæ and the unarmed dactyli of the third and fourth pairs of legs are striking features. They are not shared by *C. minuta*, but owing to the small size of this species and the fact that only one adult specimen was found it has not been possible to make a complete examination of its characters, and it may yet prove to belong to a distinct genus.

CARIDELLA CUNNINGTONI, n. sp. (Plate XIII. figs. 45-52.)

*Description*.—Rostrum (Plate XIII. fig. 45) reaching nearly to end of second segment of antennular peduncle, less than half length of carapace, slightly deflexed, teeth  $\frac{3.5+8-12}{2.5}$ . Antennular peduncle (Plate XIII. fig. 46) reaching to end of antennal scale, second and third segments longer than broad, external spine of first segment reaching to end of segment, distal spine reaching to middle of succeeding segment. Distal edge of antennal scale (Plate XIII. fig. 47) hardly projecting beyond external tooth. Third maxilliped not extending to end of antennular peduncle. First pereopods (Plate XIII. fig. 48) very stout, reaching to about end of penultimate segment of third maxillipeds; merus produced as a blunt tooth above articulation of carpus; carpus less than twice as long as broad, distinctly excavated distally; chela more than one and a half times as long as carpus and much broader, less than two and a half times as long as broad; fingers a little shorter than the palm, gaping widely, a stout curved tooth at base of immovable finger fitting into a notch at base of dactylus, apical brushes scanty and short. Second pereopods (Plate XIII. fig. 49) slender, extending beyond tip of third maxillipeds; carpus about seven times as long as broad; chela shorter than carpus, nearly four times as long as broad, fingers one and a half times as long

as the palm, a small tooth at base of immovable finger. Third peraeopods a little stouter than fourth (Plate XIII. fig. 50); merus in both with three spines below; propodus about three and a half times as long as dactylus, which is unarmed except for the terminal spine. Dactylus of fifth pair (Plate XIII. fig. 51) one-third of length of propodus, with a comb of about 37 slender spines besides the stout terminal spine. Telson (Plate XIII. fig. 52) equal to sixth abdominal somite. Outer plate of uropods slightly shorter than inner, with a transverse row of about fourteen spines.

Total length 9 mm. Eggs  $.45 \times .62$  mm.

*Remarks.*—This species is at once distinguished from all other Atyidae known to me by the structure of the first pair of chelae. In the absence of spines other than the apical one on the dactyli of the third and fourth pairs of legs, it resembles the species described above as *Limnocaridina parvula*.

*Occurrence.*—Kala, 19.xi.04. "Taken on rocks, shallow water." One specimen.

Kirando, 1.xii.04. "Taken in about 8 fathoms of water among shells." Six specimens.

Utinta, 6.xii.04. "Dredged in about 15 fathoms, among shells." Many specimens.

CARIDELLA MINUTA, sp. n. (Plate XIII. figs. 53–56.)

*Description.*—Rostrum (Plate XIII. fig. 53) hardly reaching beyond first segment of antennular peduncle, about one-quarter of length of carapace, straight, teeth  $\frac{0+4}{0}$ . Antennular peduncle not reaching to end of antennal scale, second and third segments broader than long, external spine of first segment not reaching end of segment, no distinct distal spine. Distal edge of antennal scale projecting beyond external tooth. Third maxilliped extending beyond antennular peduncle. First peraeopods (Plate XIII. fig. 54) very short and stout; carpus broader than long, strongly excavated distally; chela nearly three times as long as carpus and a little broader, about twice as long as broad; fingers two-thirds as long as the palm, slightly gaping; no tooth at base of immovable finger. Second peraeopods (Plate XIII. fig. 55) more slender; carpus twice as long as broad; chela one and a half times as long as carpus, fingers a little longer than palm. Last three pairs of peraeopods (Plate XIII. fig. 56) similar and rather stout; dactylus at least one-third of length of propodus, and little more than twice as long as broad, with eight strong spines of which the second, not the terminal one, is the largest. Telson equal to sixth abdominal somite. Outer plate of uropods slightly shorter than inner, with a transverse row of four spines.

Total length 4 mm. Eggs  $.22 \times .15$  mm.

*Remarks.*—Owing to the very small size of this species, it is extremely difficult to determine its exact branchial formula, but I have satisfied myself that it has no pleurobranch on the

last thoracic somite and that the epipods extend to the third pereopods. On these grounds I refer it provisionally to the genus *Caridella*. From the preceding species it is distinguished by the characters of the first pereopods and the well-armed dactyli of the third and fourth.

*Occurrence*.—Near mouth of Lofu, 6.x.04. "Taken on rocks, shallow water. Colour yellowish, with red spots; eggs green." One specimen, ovigerous.

Karema, 12.xii.04. "Tow-netting, surface, 8.30 p.m." Six immature specimens.

#### Genus ATYELLA, gen. nov.

Pereopods without exopods; carpus of first and second pairs excavated distally; chelæ without any distinct palmar portion. Epipods on the first three pairs of pereopods. No pleurobranchia on the last thoracic somite.

Type, *A. brevirostris*, sp. n.

This genus bears the same relation to *Caridella* that *Atya* bears to *Caridina*, differing in having the carpus of the second pereopods excavated and the palmar portion of the chelæ obsolete. Perhaps the comparison should be with *Ortmannia* (*Atyoida*) rather than with *Atya*, for the two fingers of the chelæ, the propodus and the dactylus, are not exactly alike, though the articulation between them is practically in a straight line with their opposed edges. In any case, the new genus is distinguished from both of those just mentioned by the reduced number of the branchiæ. In *Ortmannia potimirin*, the only species, so far as I know, which resembles the present genus in having no epipods on the penultimate pair of legs, Fritz Müller states that there are seven gills on each side, one above each of the five thoracic legs, one above the external maxilliped, and a very small one on the second maxilliped (Arch. Mus. Rio de Janeiro, viii. p. 166, 1892). The branchial formula for *Atyella* is the same as that given above for *Caridella*.

Referring to a bottle containing both the species described below, Dr. Cunningham notes that the specimens were "red in the dark, changing to light violet in the light; with red-brown setæ on the chelæ." Fritz Müller has described changes of colour in *Ortmannia* (*Atyoida*) *potimirin* (t. c. p. 155, also Kosmos (Stuttgart), Jahrg. iv. Bd. viii. p. 472, 1881).

ATYELLA BREVIROSTRIS, sp. n. (Plate XIV. figs. 57–64.)

*Description*.—Rostrum (Plate XIV. fig. 57) generally less than one-third of length of carapace, reaching just beyond end of first segment of antennular peduncle or nearly to end of second, slightly decurved, teeth  $\frac{4.5+10-14}{1.4}$ , those on upper edge extending nearly to tip. Antennular peduncle (Plate XIV. fig. 58) a little shorter than antennal scale; first segment equal to second and third together, external spine of first not reaching end of segment

distal spine reaching middle of second segment. Antennal scale (Plate XIV. fig. 59) little more than half length of carapace, external spine not reaching beyond distal margin. Third maxillipeds reaching a little beyond tip of antennal scale, terminal segment a little longer than preceding. First and second pereopods not dissimilar in shape and size; first pair (Plate XIV. fig. 60) hardly extending beyond penultimate segment of third maxillipeds. Carpus of first pair nearly three quarters as broad as long, less than half length of chela; that of second pair (Plate XIV. fig. 61) hardly longer than broad, about two-fifths of length of chela. Third pereopods (Plate XIV. fig. 62) stouter than the following; merus with four spines on distal half of lower edge; propodus more than half as long as merus; dactylus, including terminal spine, a little more than one-fifth of propodus, with three spines on its lower edge. Fifth pereopods (Plate XIV. fig. 63) with propodus longer than merus; dactylus, including terminal spine, about one-fourth of propodus, with about 43 spines on lower edge.

Total length, female (not ovigerous) 13.5 mm.

*Occurrence*.—Mbete, l.x.04. "Taken on rocks, shallow water." Many specimens.

Near mouth of Lofu, 6.x.04. "Taken on rocks, shallow water." Many specimens.

Kala, 19.xi.04. "Taken on rocks, shallow water." One specimen.

A very small specimen taken in a rock-pool at Kasakalawe, 4.viii.04, is referred with some doubt to this species.

*ATYELLA LONGIROSTRIS*, sp. n. (Plate XIV. figs. 65–72.)

*Description*.—Rostrum (Plate XIV. fig. 65) about five-sixths of length of carapace, equal to or a little longer than antennular peduncle, nearly horizontal, teeth  $\frac{5+10-11}{3}$ , unarmed above and below for one-third of its length from tip, teeth on upper edge becoming long and slender anteriorly. Antennular peduncle (Plate XIV. fig. 66) a little longer than antennal scale, first segment less than second and third together, external spine of first reaching beyond end of segment, distal spine reaching to end of second segment. Antennal scale (Plate XIV. fig. 67) about three-fourths of length of carapace, external spine hardly reaching beyond distal margin. Third maxillipeds not quite reaching tip of antennal scale, terminal segment equal to or a little longer than preceding. First and second pereopods similar to those of *A. brevirostris*; carpus of first pair (Plate XIV. fig. 68) five-eighths as broad as long, about half length of chela; that of second pair (Plate XIV. fig. 69) nearly three-quarters as broad as long, less than half as long as chela. Third pereopods (Plate XIV. fig. 70) considerably stouter than the following; merus with five stout spines, of which the first is one-third of length of segment from its proximal end; propodus less than two-thirds of length of



merus; dactylus, including terminal spine, about one-fifth of propodus, with two spines on lower edge. Fifth pereopods (Plate XIV. fig. 71) with propodus longer than merus; dactylus, including terminal spine, one-fifth of propodus, with about 26 spines on lower edge.

Total length, female (not ovigerous) 15 mm.

*Remarks.*—This species is very similar to the preceding, but appears to be sufficiently distinguished by the longer rostrum, the longer spines on first segment of antennular peduncle, and the smaller number of spines on dactylus of last pereopods.

*Occurrence.*—Mbete, 1.x.04. "Taken on rocks, shallow water." Two specimens.

Kala, 19.xi.04. "Taken on rocks, shallow water." Two specimens.

### iii. *General Remarks.*

So far as the Macrurous Crustacea are concerned, the chief result of Dr. Cunningham's Expedition has been to render still more striking the great richness and peculiar character of the fauna of Tanganyika as compared with that of the other lakes of Central Africa. While Nyasa and Victoria Nyanza have yielded only a single species which, with its varieties, has an enormously wide geographical range from the Nile (and perhaps Algiers) to Natal on the south, and to Queensland and New Caledonia on the east, every one of the twelve species found in Tanganyika is, so far as we yet know, peculiar to that lake. Of these, *Palæmon moorei* belongs to a genus having a very wide distribution in the fresh-waters of tropical regions; but while a number of species are known from East and West Africa, *P. moorei* is the only one yet found in the region of the great lakes. Apart from its very small size, the species does not present any very unusual or striking characters, and it is therefore impossible to attach any great importance, from the point of view of zoogeography, to its supposed affinities with other species. It may be noted, however, that all the species with which it is found possible to compare it closely are inhabitants of the East African and Oriental regions, and that the species from the Nile, while undoubtedly distinct, does not differ in such a way as to exclude the possibility of phylogenetic connection.

With the remaining eleven species, belonging to the Atyidæ, the case is very different. They represent three genera which, so far as is yet known, are peculiar to Tanganyika, and which differ from all the other genera of the family in having a smaller number of branchiæ. Whether this single common character indicates a phyletic connection between the three genera is doubtful. The resemblances between *Limnocaridina* and *Caridina*, and between *Atyella* and *Atya* or *Ortmannia*, would suggest that the reduction of the gills had taken place independently in the two cases. At the same time, Bouvier's very interesting discovery (C. R. Acad. Sci. cxxxviii. p. 446, 1904, and Bull. Sci. France et Belgique, xxxix.

pp. 57-134, 1905) that certain species occasionally present "mutations" leading at a single step from *Caridina* to *Ortmannia* and from *Ortmannia* to *Atya*, must be borne in mind as suggesting the possibility that the *Atya*-like characters of *Atyella* may have arisen independently in the Tanganyika forms. In any case, there can be no doubt that the Atyidæ of Tanganyika rank among the most highly specialised members of the family and are far removed from such primitive forms as *Xiphocaris* and *Atyæphyra*.

When describing the two species of Prawns discovered by Mr. Moore in Tanganyika, I pointed out (Proc. Zool. Soc. 1899, p. 711)\* that they threw no light on the general question of the origin of the Tanganyika fauna, inasmuch as they belong to groups which are characteristically inhabitants of fresh-water. Since then, in his book on 'The Tanganyika Problem' and elsewhere, Mr. Moore has claimed that the prawns belong to the "relict," or as he terms it "halolimnic," section of the fauna of that lake. He believes that the members of this section are distinguished by special resemblances to marine forms and by generally primitive characters. He supposes that they represent the descendants of marine species which reached their present habitat not later than the Jurassic epoch, when the present site of the lake was occupied by an arm of the sea.

It is necessary, therefore, to state definitely that there is not the smallest ground for supposing that the Macrurous Crustacea of Tanganyika have had such an origin. The groups to which they belong, the genus *Palæmon* and the family Atyidæ, are widely distributed in the fresh-waters of tropical regions, and the fact that representatives of both occur in Tanganyika is, in itself, no more surprising than the fact that representatives of both occur in the Upper Nile. Nor is it the case that the Tanganyikan species present such primitive characters as would bring them closer to the hypothetical marine stocks from which these groups have arisen. As regards the Atyidæ, at all events, the reverse is the case, for the Tanganyikan genera are in some respects the most specialised members of the family. What does distinguish the Macruran fauna of Tanganyika is the great number of species found within a limited and continuous area† and their distinctness, so far as we know, from all the species inhabiting adjacent regions. The explanation of these peculiarities is a very difficult problem and one which cannot be profitably considered apart from the similar problems presented by the other elements of the Tanganyikan fauna. For the present, however,

\* In stating (*l.c.*) that the genus *Caridina* was not known to occur in West Africa, I overlooked Hilgendorf's description (SB. Ges. naturf. Freunde Berlin, 1893, p. 156) of a species from Togoland. Bouvier has since recorded a variety of the same species from the interior of the French Congo and from the neighbourhood of Lake Tchad.

† It has lately been suggested by Dr. F. Sarasin (C. R. Congrès Internat. Zool. Berne, 1904 (1905) p. 151) that the peculiar richness in Decapod Crustacea which distinguishes the fresh-waters of Celebes may be directly correlated with the poverty of the fish-fauna of that island. It is plain that this explanation cannot be applied to the case of Tanganyika, where the fish-fauna is remarkably rich.

the characters of the *Macrura* seem to me to point in the direction of some such explanation as that which has been suggested by Mr. Boulenger in the case of the fishes, namely, that the forms now inhabiting the lake are the result of divergent evolution and specialisation during a very long period while the lake was quite isolated.

## EXPLANATION OF PLATES XI.-XIV.

## PLATE XI.

- Fig. 1. *Palæmon moorei* (p. 188), second peræopod of female. Total length of body 27 mm. 1 a. Portion of same, further enlarged.
2. *Limnocaridina retarius* (p. 192), female. Cephalothorax from the side.
3. " " female. Antennal scale.
4. " " " Peræopod of first pair.
5. " " " Peræopod of second pair.
6. " " " Peræopod of fourth pair. 6 a. Dactylus of same, further enlarged.
7. " " " Peræopod of fifth pair. 7 a. Dactylus of same, further enlarged. 7 b. Spines of dactylus.
8. " " " Tail-fan.
9. *Limnocaridina parvula* (p. 193), female. Cephalothorax from the side.
10. " " female. Peræopod of first pair.
11. " " " Peræopod of second pair.
12. " " " Peræopod of fourth pair. 12 a. Dactylus of same, further enlarged.
13. " " " Peræopod of fifth pair. 13 a. Dactylus of same, further enlarged.
14. " " " Tail-fan.

## PLATE XII.

- Fig. 15. *Limnocaridina similis* (p. 195), female. Cephalothorax from the side.
16. " " female. Antennal scale.
17. " " " Peræopod of first pair.
18. " " " Peræopod of second pair.
19. " " " Peræopod of third pair, dactylus.
20. " " " Peræopod of fifth pair. 20 a. Dactylus of same, further enlarged.
21. " " male. Peræopod of third pair. 21 a. Dactylus of same, further enlarged.
22. " " female. Tail-fan.
23. *Limnocaridina latipes* (p. 196), female. Cephalothorax from the side.
24. " " female. Antennal scale.
25. " " " Peræopod of first pair.
26. " " " Peræopod of second pair.
27. " " " Peræopod of fourth pair. 27 a. Dactylus of same, further enlarged.
28. " " " Peræopod of fifth pair. 28 a. Dactylus of same, further enlarged.
29. " " " Tail-fan.
30. *Limnocaridina socius* (p. 196), female. Cephalothorax from the side.
31. " " female. Antennal scale.
32. " " " Peræopod of first pair.
33. " " " Peræopod of second pair.
34. " " " Peræopod of fourth pair. 34 a. Dactylus of same, further enlarged.
35. " " male (smaller specimen). Dactylus of fourth peræopod.
36. " " female. Peræopod of fifth pair. 36 a. Dactylus of same, further enlarged.
37. " " " Tail-fan.

## PLATE XIII.

- Fig. 38. *Limnocaridina spinipes* (p. 197), female. Cephalothorax from the side.  
 39. " " " female. Antennal scale.  
 40. " " " " Peræopod of first pair.  
 41. " " " " Peræopod of second pair.  
 42. " " " " Peræopod of third pair. 42 a. Dactylus of same, further enlarged.  
 43. " " " " Peræopod of fifth pair. 43 a. Dactylus of same, further enlarged.  
 44. " " " " Tail-fan.  
 45. *Caridella cunningtoni* (p. 199), female. Cephalothorax from the side.  
 45 a. An egg, drawn to same scale.  
 46. " " " female. Peduncle of antennule.  
 47. " " " " Antennal scale.  
 48. " " " " Peræopod of first pair.  
 49. " " " " Peræopod of second pair.  
 50. " " " " Peræopod of fourth pair, terminal part.  
 50 a. Dactylus, further enlarged.  
 51. " " " " Peræopod of fifth pair, terminal part.  
 52. " " " " Tail-fan.  
 53. *Caridella minuta* (p. 200), female. Cephalothorax, from the side.  
 54. " " " female. Peræopod of first pair.  
 55. " " " " Peræopod of second pair.  
 56. " " " " Peræopod of fifth pair. 56 a. Dactylus, further enlarged.

## PLATE XIV.

- Fig. 57. *Atyella brevirostris* (p. 201), female. Cephalothorax, from the side.  
 58. " " " female. Peduncle of antennule.  
 59. " " " " Antennal scale.  
 60. " " " " Peræopod of first pair.  
 61. " " " " Peræopod of second pair.  
 62. " " " " Peræopod of third pair. 62 a. Dactylus of same, further enlarged.  
 63. " " " " Peræopod of fifth pair. 63 a. Dactylus of same, further enlarged.  
 64. " " " " Tail-fan.  
 65. *Atyella longirostris* (p. 202), female. Cephalothorax from the side.  
 66. " " " female. Peduncle of antennule.  
 67. " " " " Antennal scale.  
 68. " " " " Peræopod of first pair.  
 69. " " " " Peræopod of second pair.  
 70. " " " " Peræopod of third pair. 70 a. Dactylus of same, further enlarged.  
 71. " " " " Peræopod of fifth pair. 71 a. Dactylus of same, further enlarged.  
 72. " " " " Tail-fan.

3. Zoological Results of the Third Tanganyika Expedition, conducted by Dr. W. A. Cunnington, 1904-1905.—  
 Report on the Oligochæta. By FRANK E. BEDDARD,  
 F.R.S., Prosector to the Society.

[Received February 12, 1906.]

The Oligochæta brought back by Dr. Cunnington from Lake Tanganyika, and which have been submitted to me for study, belong to four new species, which I name *Ocnerodrilus (Ilyogenia) cunningtoni*, *Alluroides tanganyikæ*, *Metschaina tanganyikæ*, and *Stuhlmannia inermis*. Of these the first two are types which are